OZONE

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Ozone or trioxygen, is an inorganic molecule with the chemical formula. It is a pale blue gas with a distinctively pungent smell. It is an allotrope of oxygen that is much less stable than the diatomic allotrope breaking down in the lower atmosphere to normal dioxygen. Ozone is formed from dioxygen by the action of ultraviolet light and also atmospheric electrical discharges, and is present in low concentrations throughout the Earth's atmosphere. In total, ozone makes up only 0.6 ppm of the atmosphere.Ozone's odor is sharp, reminiscent of chlorine, and detectable by many people at concentrations of as little as 10 ppb in air. Ozone's O_3 formula was determined in 1865. The molecule was later proven to have a bent structure and to be diamagnetic. In standard conditions, ozone is a pale blue gas that condenses at progressively cryogenic temperatures to a dark blue liquid and finally a violet-black solid. Ozone's instability with regard to more common dioxygen is such that both concentrated gas and liquid ozone may decompose explosively.It is therefore used commercially only in low concentrations.

Ozone is a powerful oxidant (far more so than dioxygen) and has many industrial and consumer applications related to oxidation. This same high oxidizing potential, however, causes ozone to damage mucus and respiratory tissues in animals, and also tissues in plants, above concentrations of about 100 ppb. This makes ozone a potent respiratory hazard and pollutant near ground level. However, the so-called ozone layer (a portion of the stratosphere with a higher concentration of ozone, from two to eight ppm) is beneficial, preventing damaging ultraviolet light from reaching the Earth's surface, to the benefit of both plants and animals.Ozone, the first allotrope of any chemical element to be recognized, was proposed as a distinct chemical substance by Christian Friedrich Schönbein in 1840, who named it after the Greek verb ozein (ὄζειν, "to smell"), from the peculiar odor in lightning storms. The formula for ozone, O_3, was not determined until 1865 by Jacques-Louis Soret and confirmed by Schönbein in 1867.

For much of the second half of the nineteenth century and well into the twentieth, ozone was considered a healthy component of the environment by naturalists and health-seekers. The City of Beaumont in California had as its official slogan "Beaumont: Zone of Ozone," as evidenced on postcards and Chamber of Commerce letterhead.Naturalists working outdoors often considered the higher elevations beneficial because of their ozone content. "There is quite a different atmosphere [at higher elevation] with enough ozone to sustain the necessary energy [to work]," wrote naturalist Henry Henshaw, working in Hawaii.Seaside air was considered to be healthy because of its "ozone" content but the smell giving rise to this belief is in reality that of rotting seaweed.Ozone is colourless or slightly bluish gas (blue when liquified), slightly soluble in water and much more soluble in inert non-polar solvents such as carbon tetrachloride or fluorocarbons, where it forms a blue solution. At 161 K (–112 °C; –170 °F), it condenses to form a dark blue liquid. It is dangerous to allow this liquid to warm to its boiling point, because both concentrated gaseous ozone and liquid ozone can detonate. At temperatures below 80 K (–193.2 °C; –315.7 °F), it forms a violet-black solid.

Most people can detect about 0.01 μmol/mol of ozone in air where it has a very specific sharp odor somewhat resembling chlorine bleach. Exposure of 0.1 to 1 μmol/mol produces headaches, burning eyes and irritation to the respiratory passages.Even low concentrations of ozone in air are very destructive to organic materials such as latex, plastics and animal lung tissue.Ozone is diamagnetic, which means that its electrons are all paired. In contrast, O_2 is paramagnetic, containing two unpaired electrons.

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Today, the Montreal Protocol on Substances that Deplete the Ozone Layer (updated many times since its original passage in 1987) incorporates many of CSD's scientific findings. In support of the Montreal Protocol, CSD researchers work with international colleagues, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to periodically update governments on the latest scientific understanding of the ozone layer. The quadrennial report, Scientific Assessment of Ozone Depletion, compiled from the work of hundreds of researchers representing dozens of countries and subjected to a formal review process, is coordinated and prepared at CSD prior to publication under the auspices of the WMO and UNEP.

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